The Monthly Review

Published by the AMERICAN ELECTRO-PLATERS' SOCIETY

SEPTEMBER 1937

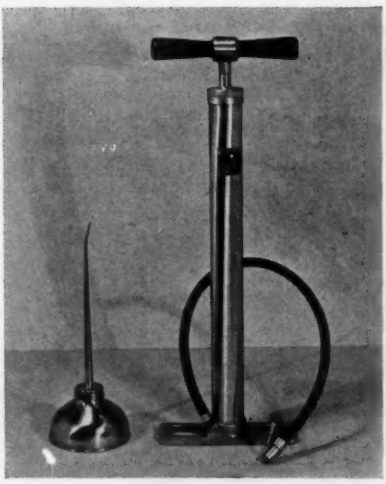
Engin. brary

Not at all Fancy **BUT....**

Made into Better Merchandise

at Low Cost

by the **LEA Method of Polishing**



For the past few months we have been illustrating our messages with the more beautiful articles such as lamps, service plates, coffee urns and bonbon dishes. But by no means is the cost-cutting Lea Method of finishing confined to articles purchased by the fair sex.

Here are two prosaic articles of interest only to men. The pump, made of steel tubing, was polished with Grade C Lea Compound to give the proper surface for copper plating. The oil can was treated with Lea Compound and then directly clear-lacquered and packed. In neither case was washing after polishing necessary. Lea Compound is *greaseless*.

The point we wish to emphasize is that desired finishes, no matter what kind or for what purpose, can usually be done by the LEA Method at an exceptionally low cost. We will be glad to consult with you on your problems.

THE LEA MANUFACTURING CO.

24 CHERRY AVENUE, WATERBURY, CONN.

Specialists in the Production of Clean-working Buffing and Polishing Compounds

US EQUIPMENT

SINCE 1896

For Plating, Metal Cleaning, Pickling, Acid Dipping, Drying and Allied Applications.

FULLY AUTOMATIC **SEMI AUTOMATIC**

MANUALLY OPERATED
For every requirement

PLATING BARREL APPARATUS
For all finishes

STILL TANK EQUIPMENT
For general plating

VARIABLE SPEED PLATING APPARATUS
For all kinds of plating

CONTINUOUS PLATING UNITS
Any combination of operations for cleaning, plating, rinsing and drying

MECHANICAL CLEANING APPARATUS
Any series of operations

AUTOMATIC ACID TREATMENT UNITS
Any combination of operations

DRYERS
Rotary Drum, Conveyor and Table Types

GENERATOR EQUIPMENT
Generators — Motor-Generator Sets

SOLUTIONS
Plating, cleaning, acid treatment, etc.

U. S. GALVANIZING & PLATING EQUIPMENT CORPORATION

Incorporated 1896

30 Heyward Street Brooklyn, N. Y.

The Monthly Review

Published by the AMERICAN ELECTRO-PLATERS' SOCIETY

A Society for the Advancement of the Science of Electro-Plating

SEPTEMBER 1937

The Boston Amendment	645
Klinkenstein — The Prevention of Spotting-Out	647
Research Committee Members 1937-38	658
Newark Branch — Gold Electroplating	659
Here and There	667
Branch News	669
Abstract Section	678
Vice President Austin Fletcher Sends a Message	684
Membership Report	686
Buyer's Guide	696
Branch Directory	699

SUBSCRIPTION $3.00 A YEAR

Entered as second class matter at the Post Office at Springfield, Mass., September 8, 1930, under Act of August 24, 1912.

Acceptance for mailing at special rate of postage, provided for in section 1103. Act of February 28, 1925, authorized September 3, 1926.

DETERMINE pH in 5 SECONDS with UDYLITE pH PAPERS

Udylite pH papers enable you to determine pH quickly . . . easily . . . accurately, right at the tank at any time. Only a few seconds are required for a pH result as accurate as that obtained with the quinhydrone equipment.

Packed neatly in boxes of 200 strips, the papers may be carried in the pocket or kept in any handy spot. Udylite pH papers are available in seven pH ranges from 0.
(strongly acid) to pH 13.5 (strongly alkaline)

Write for your copy of descriptive bulleti
which gives detailed information.

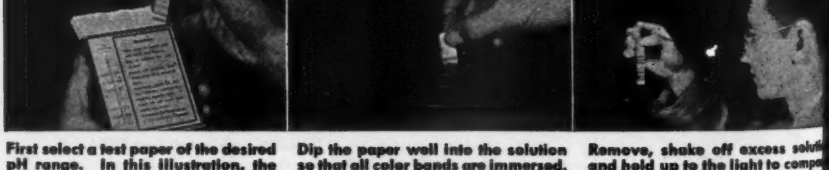
. . .

THE UDYLITE COMPAN

1651 E. Grand Blvd., Detroit, Michig

Branches: New York • Chicago • Cleveland • San Francis

ANYONE CAN DETERMINE pH IN 5 SECONDS! HERE'S HOW IT IS DON



First select a test paper of the desired pH range. In this illustration, the pH paper selected is for white nickel solution with pH between 5.2 and 6.7.

Dip the paper well into the solution so that all color bands are immersed. A quick dip of about one second is all that is necessary.

Remove, shake off excess soluti
and hold up to the light to compa
Beginners may obtain better resu
by placing the wet paper on a gl
plate.

The MONTHLY REVIEW

Published by the
AMERICAN ELECTRO-PLATERS' SOCIETY

Publication and Editorial Office
90 Maynard St.
Springfield, Massachusetts

VOL. XXIV SEPTEMBER 1937 NO 9

The Boston Amendment

Inasmuch as the sentiment regarding the proposed Boston Amendment to the Constitution of the A. E. S. was so evenly divided at the New York Convention, it might be profitable, if our members would write to the REVIEW regarding their views.

We have received a letter from Mr. Bert Sage of Boston Branch expressing his sentiments as an individual member of the A. E. S. In publishing this letter, we are aware that members of other branches will not agree with the opinions expressed. These members have a right to be heard and we will publish such letters as come to us, either pro or con, provided they are prompted by the spirit of fairness, with no bitterness of feeling or personalities involved. The broadening of our membership requirements is being discussed by every branch; it will have to be solved sooner or later.

We are asking our members therefore, to send us your letters as Mr. Sage has done, give us your honest convictions without prejudice. It is possible that in this way we may come to a mutual understanding that will be of benefit to all parties concerned. Mr. Sage writes as follows:

"I personally fail to see where the proposed Boston amendment to the Constitution of the A. E. S. would entail any hardship on us as Foremen Platers. As I see it, it would create a better understanding between us all, who are interested in the Art of Electro-plating. The future of electroplating and the A. E. S. is greater than we can imagine at this time, but it will be beset with many obstacles, as in the past.

We can not afford to be smug, and think we cannot be dispensed with, that is a fallacy. It is only by the continual development,

of new finishes, and new methods that we can obtain the position we intend to hold.

We as foremen platers have not the time or the background to do the Research Work necessary, in the development of new finishes and methods, and so we must look to men who have the necessary background and training to do this for us and encourage them into our organization to work for the best interest of all.

Twenty-seven years ago the art of electro-plating was a novelty; today due to certain conditions which we cannot fail to recognize, it has become an essential beautifier and protector of base metals. The greatest advance to this end was the founding of our Research Committee and the work it has done. The members of this committee mostly concerned with the actual work done have been and are our Associate members.

During the depression, steel mills, brass mills, aluminum refineries and others were busy in developing alloys that would give the public the protection and beauty they were looking for without our aid.

We must recognize these conditions as being competitors of ours, and that should cause us to look to our future with greater concern, not with bias or prejudice, and make us realize the facts as they actually are today.

If we give our Associate members the recognition that is their due, we will be in the position to encourage them and others who are now outside our fold to work in greater harmony to the eventual betterment of our industry.

Whilst the A. E. S. was formed by foremen platers, it was formed primarily, if I read the Constitution aright, for the improvement of the art of electro-deposition in all its branches, and the dissemination of the knowledge of its practice.

All laws and rules must be so formed that the Society will promote no other object than the education of its members in the principles of electro-plating and the finishing of metals. I think that alone answers the position as it is intended and ends the fear that any group could control the A. E. S. for commercial gain. It would be my greatest regret if I permitted a feeling of importance to kill the real objectives of the A. E. S."

The Prevention *of* Spotting-Out

A Review of Conditions Affecting the occurence of Crystal and Stain Spotting and Methods for their Prevention.

By
*GUSTAVE KLINKENSTEIN**

Read at the New York Convention, 1937

SPOTTING-OUT is a subject of continuous interest to the electroplater. Few of the many troubles that beset him have in the long run caused him greater financial loss and very few rouse him to a higher degree of exasperation.

One of the peculiarities of spotting-out is that it is not a condition that can be kept at all times under absolute control. You may flatter yourself today that you have gotten the better of it, and tomorrow back may come a collection of your products, all specked and mottled, and accompanied with caustic comments on the quality of your workmanship.

Twenty years ago, G. B. Hogaboom declared that spotting-out was one of the unsolved problems of electroplating. Today we know a great deal more about it, thanks largely to the research work sponsored by this Society and carried out ten years ago by W. P. Barrows at the United States Bureau of Standards.

We now know that several factors are involved in spotting-out, including the product itself, the process by which the product is cleaned and plated, and the lacquer that is applied after the plating. If anything is wrong with any of these factors, spotting-out is likely to occur. This means that the electroplater is not in full control of the situation. To avoid trouble, not only must the electroplater do his work properly, but so too must the maker of the product to be finished and the maker of the lacquer to be applied. This division of responsibility is one of the reasons that spotting-out has so vexed the electroplating industry.

Barrows' report of his research work was published in 1929 by the Bureau of Standards as Research Paper No. 72 entitled, "The Spotting of Plated or Finished Metals." Every electroplater should be thoroughly familiar with this work, and most of them probably are. Yet technical magazines covering the electroplating field, both here and abroad, are constantly receiving requests for advice as to how to prevent spotting. Hence, it may be well to

*Vice-President and Technical Director, Maas and Waldstein Company, Newark, N. J.

review Barrows' principal points as they do not appear to have been reprinted since their original publication.

SPOTTING DUE TO SEVERAL CAUSES

As Barrows points out, and electroplaters well know, the spotting of products after finishing may be due to any of several different causes, such as blistering of the deposit because of faulty plating solution, imperfect cleaning, deposits in places so thin that they come off during subsequent treatment, insufficient rinsing of the products after removal from the plating bath, and so on.

Such errors in technique are readily corrected when discovered. But spotting also may occur when none of these rather elementary mistakes has been made. In studying these latter cases Barrows made an important discovery, namely, that two kinds of spotting, very different in character, had previously been confused by electroplaters. He called these "crystal spotting" and "stain spotting" respectively.

CRYSTAL SPOTTING

Crystal spotting only occurs on copper, silver or nickel surfaces which have been given an "oxidized" finish by means of sulphide solutions, and are then lacquered.

These spots range up to one-eighth inch in diameter; they are black or brown in color, and under magnification are obviously crystalline in structure.

Barrows showed that such spots are not due to any fault in the product or the finishing process, but are caused by sulphur in the form of free sulphur or hydrogen sulphide, which comes in contact with the products after they are finished.

The principal sources of this sulphur seem to be as follows:

1. From furnace gases in the finishing plant. The remedy here is, of course, to suppress the gases or protect the products from them.
2. From the paper in which the products are wrapped. Paper occasionally contains some free sulphur. All paper or cardboard used for wrapping or boxing should be carefully tested for freedom from sulphur compounds.
3. From rubber bands used in packaging. Most rubber contains considerable free sulphur and will cause crystal spot-

ting on "oxidized" products even if separated from the product by several thicknesses of paper. Hence, rubber in all forms should be kept away from these products.

4. From the coal gases encountered during shipment by railroad or steamship. The remedy here is careful packing.

Lacquer also plays a part in crystal spotting, for the spots appear only on lacquered articles. This does not mean that the lacquer causes the spots, but that the lacquer film holds the little crystals in place after they are formed. Apparently these crystals do not adhere strongly to the sulphide coating, and drop off or are easily rubbed off unlacquered surfaces. However, it is evident that the crystals could not form if the lacquer coating were impervious to sulphur.

As a matter of fact, lacquers vary widely in this respect. Some lacquers afford little protection against crystal spotting, while others, developed by modern research, are very effective. The latter type, of course, should always be used for finishing "oxidized" products. Absolute protection under all circumstances cannot be secured, but if the proper lacquer is employed and the other precautions are taken, crystal spotting should cease to be a serious trouble.

STAIN SPOTTING

Stain spotting is much more serious than crystal spotting because it affects a far greater variety of products. The cause of this trouble is now well understood. Salts derived from the cleaning, plating or coloring processes are left in the pores of either the base metal or the deposited coating. Later on, when the products are exposed to a humid atmosphere, the residual salts absorb moisture, swell and overflow the pores, and cause stains of varying size, shape and color by either attacking the metal or rendering it susceptible to attack by corrosive substances in the atmosphere, such as sulphur.

Almost any of the salts used in cleaning and plating baths can act in this manner, but the chief offenders are the alkalies and, especially, the cyanides. Though these salts are very soluble, it seems to be impossible to remove them completely by mere rinsing when the surface of the product is fairly porous, so that more drastic methods have to be employed in order to prevent the stains from appearing.

The first step in the prevention of stain spotting is to avoid very porous castings. If need be, change the method of casting or the metal used, for no subsequent care will overcome the handicap of a very porous metal.

In this connection, Barrows mentions the fact that in the case of a thin-walled cast-iron flush-bolt case, stain spotting was reduced by increasing the thickness of the walls. He points out that this change in design did not decrease the porosity of the metal, but did reduce spotting from 10% to 15%. He remarks that this subject deserves further study.

Avoid the use of alkalies in the cleaning and plating processes as far as possible. Barrows cleaned, plated and "oxidized" certain cast brass and bronze products with alkaline solutions, and also produced a similar finish on the same products using mechanical cleaning, an acid copper bath, and ammonium polysulphide for coloring. He found that the latter process greatly reduced spotting. However, in practice the use of alkalies can hardly be avoided, and the chief precaution seems to be to keep the free cyanide content of baths at the minimum. High cyanide content undoubtedly encourages spotting.

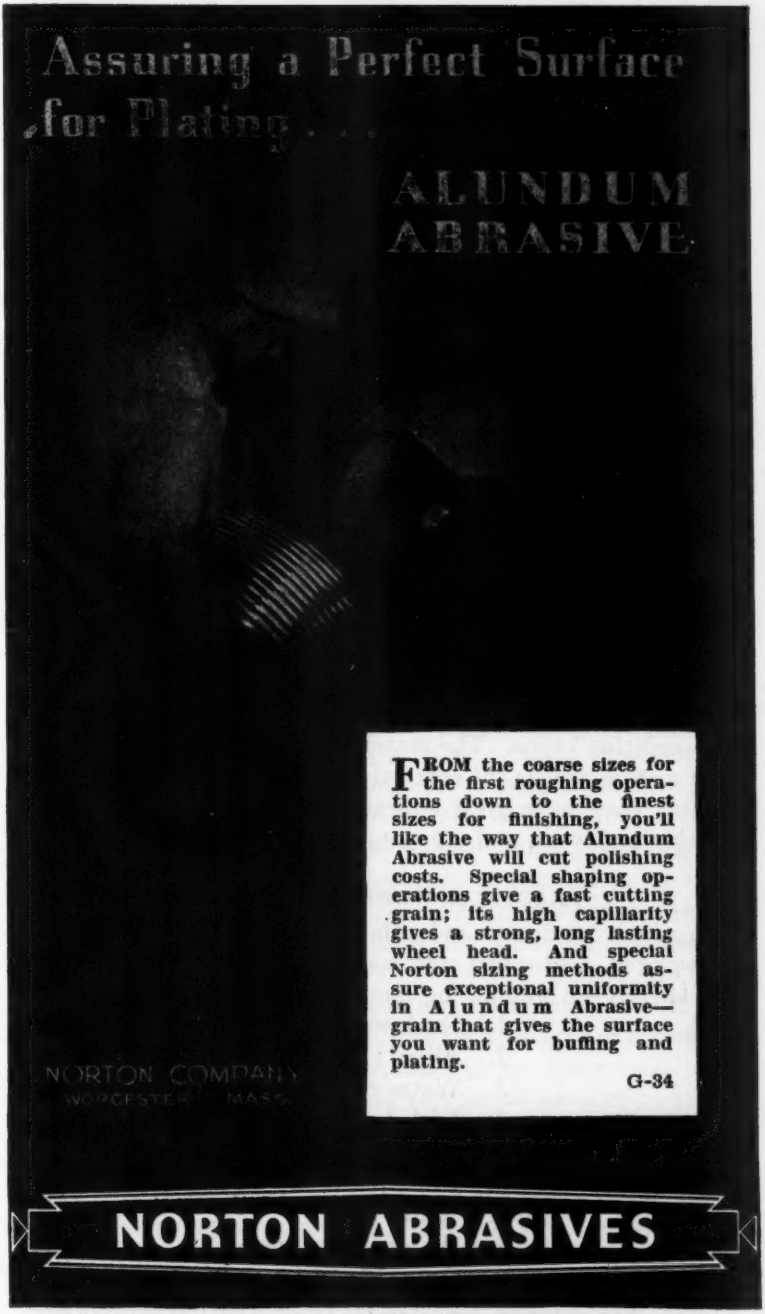
Next, rinse thoroughly after plating. Usually the use of hot and cold water alternately is recommended, as this treatment enlarges and contracts the pores and should help to remove the salts inside them. However, rinsing only, no matter how thorough will fail to prevent stain spotting under certain conditions.

After the products have been rinsed it is advisable to let them stand for 24 hours, or at least over night, in as humid an atmosphere as possible. If the products are not too porous, this will bring a large proportion of the residual salts to the surface. They are then easily removed by scratch-brushing or buffing, or by bright or mat dipping, if these processes are used. Barreling or burnishing at this point will be helpful, as these treatments tend to seal in some of the remaining salts.

Another helpful point is to treat the products by heating at 250° F. for one or two hours if they will stand this temperature. This baking opens the pores, dehydrates and inactivates the salts.

LACQUERS THAT REDUCE SPOTTING

The procedure just discussed must, of course, be frequently modified according to circumstances, but if carried out sub-


Assuring a Perfect Surface for Plating . . .
ALUNDUM ABRASIVE
FROM the coarse sizes for the first roughing operations down to the finest sizes for finishing, you'll like the way that Alundum Abrasive will cut polishing costs. Special shaping operations give a fast cutting grain; its high capillarity gives a strong, long lasting wheel head. And special Norton sizing methods assure exceptional uniformity in Alundum Abrasive—grain that gives the surface you want for buffing and plating.
G-34
NORTON COMPANY
WORCESTER, MASS.
NORTON ABRASIVES

Please mention THE MONTHLY REVIEW *when writing*

stantially as outlined it will remove the greater part of the pore-held salts. Yet unless the products being finished are very compact in structure, some of the salts are almost certain to be retained. The next step in minimizing stain spotting is to use a lacquer coating that will, as far as possible, render these retained salts harmless. In many cases it is advisable to treat the products with water-dip lacquer immediately after the final rinsing.

Water-dip lacquer is designed to coat products, especially those that have been brass-plated with lacquer when the products are still wet. It is made up with a special combination of bases and solvents that quickly discharge the water from the surface. This operation seals the pores and provides a finish that may be the final one on products where the requirements of appearance and service are not severe. Where a better finish is desired, it allows for a delay between the completion of plating and the finishing operations. Such delays often occur in plants where the straight-line production method is not employed and the productive capacities of the several departments vary, with the result that work may lie around for hours or over night before being lacquered.

The lacquer for the final finish should be of the special "non-stain spotting" type. The materials used in this type of lacquer resist and neutralize the residual salts retained in the pores of the metal. They have good adhesion, good color retention, resist abrasion and wear, and are suitable for both indoor and outdoor use.

PRACTICAL WORKING SCHEDULES

On trunk hardware and other miscellaneous small stamped brass-plated, cold-rolled steel parts, the following procedure has been effective in eliminating spotting out:

1. Rack work
2. Alkali clean
3. Water rinse
4. Nickel plate
5. Water rinse
6. Brass plate
7. Water rinse
8. Water-dip lacquer
9. Oven dried

In another instance, considerable trouble with stain spotting on

malleable iron brass plated castings was encountered. After a great deal of time and work in experimenting with all the conditions in the molding, cleaning, plating and finishing of the castings, a method was successfully worked out that eliminated the spotting-out trouble.

1. Alkali clean
2. Brass plate in a barrel, keeping the free cyanide as low as possible
3. Water rinse
4. Allow work to stand over night
5. Bright dip
6. Ball roll to a bright finish
7. Water rinse
8. Heat in an electric oven for two hours at 250° F.
9. Lacquer in a centrifugal

In both of these practical production schedules there are incorporated the points mentioned earlier in the paper as helpful in reducing spotting-out.

In conclusion, I need hardly point out to a group of practical electroplaters that the formula for the absolute prevention of spotting in its various forms has yet to be invented. Spotting will occasionally take place even though the utmost pains have been taken at every step in the manufacturing and finishing process. However, care will eliminate most of the trouble; and, if I may speak for the other reputable manufacturers of lacquers, we stand ready at all times to do everything within our power to help those whose products have become afflicted with this very troublesome and annoying condition.

CHAIRMAN BARROWS: Are there any questions?

DELEGATE J. W. HANLON: Mr. Chairman, I am not the official questioner, but I have some questions I should like to ask. Mr. Klinkenstein, would you be willing to venture an opinion at this time, regardless of the cost of the product, of the effect on porous castings of solutions that contain potassium cyanide or sodium cyanide? We can get very excellent spotting-out from either one of them, but some of us platers are just a little dubious as to which is the better.

MR. KLINKENSTEIN: Without having any opinion based on actual results, I am going to hazard a guess that probably po-

tassium cyanide would give you less trouble, for the reason that it is more soluble than sodium cyanide, and if rinsing is done it should help to accomplish a better rinsing job.

MR. ARCHER: I should like to ask, in the sweating operation you spoke of, if it is possible to rinse those sweating-out salts off with just water without any special operation or mechanical abrasion?

MR. KLINKENSTEIN: If the work is not acid dipped you will not remove the stains unless the work is wire brushed or finished in some other way. The actual appearance is a highly stained surface, and you cannot remove that with water.

MR. ARCHER: Can the water-dip lacquer you were telling us about be used for a final finish, or do you recommend the use of a final lacquer after that?

MR. KLINKENSTEIN: Water-dip lacquer may be used as a final finish on a great deal of work where the service requirements are not very severe. I may mention especially trunk hardware, corners, chains and a lot of small stamped parts where appearance and great durability are not the most important points. Water-dip lacquer in those cases will give you a very economical final operation.

MR. ARCHER: Can the thickness or thinness of this lacquer be regulated?

MR. KLINKENSTEIN: Yes. The thickness or thinness of the coating, as you say, may be regulated by the amount of gum lacquer and thinner used in the mixture as you would in any ordinary lacquer operation.

MR. ARCHER: Inasmuch as the spotting-out is mostly due to porosity of the metal, it may be due to the surface tension of the material in the course of the plating. Don't you think it could reduce the spotting-out by reducing the surface tension with materials such as alcohol or acid?

MR. KLINKENSTEIN: Any rinse with any material of that nature has actually not proven itself in practice. Time and again, work has been done with a great deal of rinsing, alternately using hot and cold water and carrying that rinsing to an extreme, and under porous casting conditions spotting-out occurred anyway. It was even carried out to an extent where the castings were boiled in water for hours, so that the effectiveness of the operation would be at the maximum, and spotting-out occurred nevertheless.

DELEGATE J. W. HANLON: May I ask another question, Mr. Klinkenstein? Suppose a man had a porous casting and he was to coat it up with a celluloid base lacquer, finished his job and then attempted to put gum lacquer on. What do you think would be the result?

MR. KLINKENSTEIN: I do not think the result would be very good. The operation is really reversed from that of good practice unless the coating lacquer were the special non-stain spotting type, which is made so to neutralize the salts. Spotting-out would occur anyway, and I do not quite see the advantage it has by putting on a gum lacquer on top, which is quite brittle and not nearly as tough as an ordinary nitrocellulose lacquer. The reverse, however, would result to advantage because a very thin gum lacquer or water-dip lacquer would get into the pores and tend to seal the pores so that the chemicals held in there would be inactivated and sealed down. Then, following that with a coat of good lacquer would produce a tough wearing finish.

DELEGATE HANLON: We have occasions where the dirt from buffing or one thing or another sinks pretty deep into the crevices, and we make it a practice that after application to steam out the work before plating, and even before steaming it out give it a wash before finishing.

MR. KLINKENSTEIN: Steaming it out for a long enough period would tend to reduce spotting-out, as it tends to swell the salts which are hygroscopic and absorb the moisture and overflow the pores, and would be dissolved over the surface and automatically become rinsed off by the steam. That would help, if other conditions were not bad, to eliminate the spotting-out trouble.

DELEGATE MEYER: I think if Mr. Klinkenstein would just give us a little analysis of the factors that they use in the development of a non-spotting-out lacquer, it might shed some light on the problem of spotting-out. Here is what I have in mind:

Some time ago we tried to increase the specific physical, or, you might in some cases say, chemical properties of a lacquer film which would give an indication of the relative spotting-out resistance of a particular lacquer. Now, the first thing that comes into our minds is the permeability to water vapor. How does that rate with a non-spotting out lacquer?

The second thing that enters our minds is the alkali resistance of the lacquer.

Third, a point which may be a little far fetched: Is there a difference between various lacquers in their interfacial surface tension or the surface tension of the lacquer coating itself, so that some lacquers may penetrate the pores more readily than others? Or are there other factors besides these I have mentioned which are more important in the study of a spotting-out-proof lacquer?

MR. KLINKENSTEIN: You really have given me quite a job there, Mr. Meyer. I do not know whether I am going to remember your questions one after another, but I will try to take them up.

In substance, no study was made of interfacial relationships. The studies that were made in developing these lacquers were their specific non-spotting-out properties; and studying the problem from the standpoint of dealing with alkaline salts in the pores. We, therefore, studied lacquers that had either acidic character or relation to acidic character, that would have acid available for neutralization in contact with alkaline salts as they appeared. That really was the answer after we made a complete study of the problem. In every case, a lacquer that had definite acidic character proved to be a lacquer that had good stain-spotting resistance. It was a question then of getting a type of acid that did not, in itself, cause a discoloration to occur on contact with the metal.

Now, if I have not covered your questions altogether, I will try again.

DELEGATE WITTIG: I understand from your talk that if we take all the precautions that you have listed, we should have no trouble, or we should have but little trouble with spotting-out. Now, spotting-out happens to be a very serious problem with me, and one in which I have been interested for a long time. I have taken every precaution that can be taken, and still I experience some spotting-out. I believe some of them are impossible to avoid.

Take, for example, your plating control. I have not avoided blistering in plating. The plating was not faulty, the deposit was heavy, the rinse was sufficient, and still we had spotting. Our product was tarnished. No rubber bands were used, and even when the surface was not lacquered we still had spotting-out. We also had spotting-out when lacquer was applied. The alkaline solution runs from 9.8 to 10.20. There again you have alkalinity, so how are you going to get by with keeping your alkalinity at a

minimum when those are necessary for good plating? And as for the use of lacquer, we tried the products of a number of manufacturers who made the claims that their products would either prevent or minimize the amount of spotting-out, and still we have it.

MR. KLINKENSTEIN: The answer to all of your problems is a closer observation of your own plant conditions. It would be very difficult for me to tell you exactly what your trouble is without going into that specifically. However, from practical experience out in the field, these precautions which I have mentioned are actually preventing spotting-out where spotting-out was a very bad condition.

I want to again emphasize sweating in a humid atmosphere for twenty-four hours. It is a very excellent recommendation. Then, if that does not do it altogether, dehydration at 250° will be another very important factor in eliminating trouble. Your work should be checked as far as porosity of metal goes. I know it is impossible to get metal that is free from all porous conditions. Still, attention to that can reduce the porosity, and a combination of all the factors and a closer check will undoubtedly reduce or eliminate all spotting-out.

There is another type of lacquer that is coming into use, which I have not mentioned in this paper, which in itself tends to reduce spotting-out, and that is a synthetic type of lacquer. It has characteristics and properties similar to the gum lacquer or water-dip lacquer that I have referred to in my paper.

DELEGATE SAGE: In the dehydration, you dehydrate that spot, what happens if the air is humid when you take it from the oven?

MR. KLINKENSTEIN: It is very important, if you are going to dehydrate in an oven, that the work be carried into the lacquer quickly, warm, if necessary. You cannot allow the batch of work to lie around and pick up humidity from the air. You want to seal the surface with the lacquer as quickly as possible even, if necessary, putting the work in the lacquer while warm.

It has been done in practice, and where necessary coils have been put in the lacquer through which water was circulated so that the temperature of the lacquer could be kept down and overcome the rising temperature from the heated work.

1937-38 RESEARCH COMMITTEE MEMBERS

A. E. Anderson
New Jersey Zinc Co.
Palmerton, Pa.

William Blum
Bureau of Standards
Washington, D. C.

T. H. Chamberlain
The NewHaven Clock Co.
New Haven, Conn.

G. M. Cole
Delco-Remy Division
General Motors Corp.
Anderson, Indiana

J. E. Downs
Remington Rand Co.
Middletown, Conn.

Albert Hirsch
1945 W. Airdrie St.
Philadelphia, Pa.

G. B. Hogaboom
Hanson-Van Winkle-Munning Co.
Matawan, N. J.

Carl Huessner
Chrysler Corp.
Detroit, Michigan

W.J.R.Kennedy
90 Maynard St.
Springfield, Mass.

B. H. McGar
Chase Brass & Copper Co.
Waterbury, Conn.

B. S. Sage
A. S. Campbell Co.
Boston, Mass.

P. M. Savage
McGean Chemical Co.
Republic Bldg.
Cleveland, Ohio

Erwin Sohn
Standard Sanitary Co.
Louisville, Ky.

C. S. Tompkins
J. B. Ford Sales Co.
3958 Calumet Ave.
Chicago, Ill.

W. A. Wesley
International Nickel Co.
Bayonne, N. J.

A. B. Wilson
Chevrolet Gear & Axle Plant
Chevrolet Motor Division
General Motors Corp.
Detroit, Michigan

Get Your Copies of the 1937 Convention Proceedings Now

•

There are a few copies of the 1937 Convention Proceedings left. These contain all the papers and discussions read at the Educational Sessions. The price $5.00 plus 25c for postage.

Address your orders to
90 Maynard Street
Springfield, Mass.

Gold Electroplating

Presented by
NEWARK BRANCH

Read by Mr. Paul Oldam
at the New York Convention 1937

THE members of the Newark Branch of the American Electro-Platers' Society, upon learning that their neighboring and sister Branch, New York, was to act as host to the American Electro-Platers' Society at their Convention in 1937, deemed it fraternal to cooperate and be represented on the Educational Program.

After considerable deliberation the subject selected is one that in the past years literally has been greatly neglected, although every plater or establishment has some dealing with it, namely, gold electroplating in cyanide solutions.

The data collected herein is not technical to any high degree but more practical, which has been brought out under general discussions on the subject of gold plating at regular meetings, by practical platers, relative to the governing factors involved in the process and operation in their actual working-day experience. Some of the statements are broad, however workable to the satisfaction of the plater.

The history of gold electroplating can be stated without doubt that it is the parent to our present-day era in the art of electroplating. Gold, electrodeposited in the early stages from its cyanide solutions, was successful and genuine. However, the public at large was skeptical as to the actual yield in the operation, that it was truly gold electrodeposited. Those engaged in or familiar with the process at that time were called charlatans or magicians. Today, the same as in any other scientific endeavors, the public at large does possess the knowledge that the process involved in the electrodeposition of gold is truly legitimate in every respect, for the primary laws of electrochemistry govern the process.

Although gold is not a corrosive resistant, depending on the base metal applied, and the cost too great to be applied for such specific requirements, it has however found its way into many industries with its everlasting and inhibitive factor, namely, as a resistant to tarnish.

Applications of this highly desirable electrodeposited metal can be found on surgical instruments, jewelry, optical goods, hand-bag frames, cigarette lighters, picture frames, watch cases, watch and wrist bracelets and many other unlimited fields of manufacture.

From its early background to the present day the formulation of a gold electroplating solution has as its ingredients chiefly gold and cyanide. However, the electroplater and chemist have introduced into solution other ingredients that have proven beneficial, such as reducing agents and conducting material. With these and other addition agents, preparation and operation of solution shall be discussed. Although prepared compounds of gold can be purchased in the cyanide form, from 41 to 71 per cent in gold content, it is still the desire of the plater to prepare the solution from the metallic state into various liquid formations.

Of the many methods and solvents used to dissolve metallic 24 karat fine gold the best suitable solvent adopted by the plater is Aqua Regia, a mixture of hydrochloric and nitric acid. The true formula for Aqua Regia is 3 parts of hydrochloric acid by volume and one part nitric acid. Many platers have their doubts regarding the exact formula. Some use a mixture of 2 to 1 and others a mixture of 4 to 1, always the larger volume being hydrochloric acid. The skeptical point is possibly derived from the quality of the acid used. The larger amounts of HC1 are possibly used when commercial acids are employed, and the smaller amounts when chemically pure acids are used. In all cases, the commercial acids should be eliminated from the operation, as the impurities such as iron and other foriegn matter do not assure satisfactory results. The amount of the Aqua Regia mixture used to dissolve one troy ounce of 24 karat gold also depends upon the grade of the acid used. Amounts from 8 to 12 liquid ounces are ordinarily used when the commerical grade of acid is employed. However, 6 ounces of the chemically pure acid Aqua Regia mixture will satisfactorily dissolve or cut down 1 troy ounce of gold.

The procedure and apparatus usually employed to dissolve the metal gold consists of a silicon, glass or earthenware evaporating dish, beaker or bottle. The evaporating dish is then placed on top of a sand bath or water bath. The beaker or bottle, if used, should be immersed in a water bath. The fine gold then is sheared into small pieces and placed into the evaporating dish, and 6 ounces of

freshly mixed Aqua Regia poured on the contents in the evaporating dish, then heated slowly to about 150 degrees F. All the apparatus involved should be placed into a chamber with a suction draft to permit the fumes liberated to be expelled to the outside air during the operation.

After the gold is dissolved it is then transferred into a three-gallon crock to which 2 gallons of water have been added. While stirring, an amount of ammonium hydroxide from 1 to 2 times the volume of Aqua Regia, depending on the strength of the NH_4 (OH) used, is poured into the crock, the balance of the water added, then tested with litmus paper to show an alkaline reaction. Allow the gold to precipitate and wash by decantation several times until the solution is neutral to litmus paper. The precipitated gold is dissolved by adding a cyanide compound, usually the potassium or sodium salt. Sufficient amount of the cyanide salt is added to convert the gold fulminate into the double gold cyanide, with a small amount introduced as free cyanide.

Part or all of the solution is taken to make the electroplating bath, depending upon the nature of the articles to be plated. From this point on the electroplating solution introduces itself to the skill and knowledge of the plater to produce satisfactory gold electro deposits.

The question as to the kind of cyanide salt, potassium, or sodium which is best suited in the process of gold electroplating brings about an almost universal problem. The establishments doing contract plating, or where gold electroplating is done on a large scale in the manufacture of base metal articles for decorative purposes, use the sodium compounded cyanide, whereas the jewelry and kindred trades adhere strictly to the use of the potassium salt. The difference in cost is the possible objective. For such a reason the sodium salt is adopted more than the potassium salt.

From a technical viewpoint, the sodium cyanide has its disadvantages regarding its solution and effect to the deposit. Solutions possessing the sodium radical have a tendency to form carbonates more readily. The deposits obtained from solutions containing sodium are hard and coarse-grained, and the applications of current densities are limited to a narrower range, affording uneven color distribution, whereas the solutions containing the potassium cyanide are better in the respect that the carbonates that are formed are more soluble. The deposits are of a soft and

fine texture, also permitting the use of greater current densities, which yield more uniform color coverage.

The metal concentration of gold plating solutions varies from 1 to 10 pennyweight per gallon of solution. Oftentimes when a bath contains little or no gold, addition agents are introduced into the solution to stimulate the metallic ions left in the solution and carry them to the cathode. Such procedure leads to no avail, making matters worse. Considering that gold is the main ingredient in the solution and the only source of supply when insoluble anodes are used, for this reason and in all cases a substantial amount of gold should be in the solution, to avoid all sorts of trouble. Deposits obtained from solutions that contain on the average 3 to 5 pennyweight of gold produce uniform color coverage, with good throwing power, even when low current densities are employed.

Of the number of cyanide gold plating solutions in commerical use as general opinion given regarding the free cyanide radical, a variation of from .2 to 1.5 ounces per gallon is maintained in the solution, for considerable reasons, such as to the type of work to be plated, the kind of anodes used, and in respect to the amount of carbonates in the solution. Each particular above-mentioned requisite or objective should be studied in relation to the free cyanide.

Sufficient free cyanide should be present in the solution to keep the metal gold in the double cyanide form and to prevent the formation of oxides on the anode. An excess, however, should be avoided. Evidently the conductivity is greater, but the resulting deposits would be of a pale or red color.

Phosphates in the form of sodium or potassium phosphate are introduced to fresh or new solutions in the amounts of from 2 to 8 ounces per gallon, also added when the solution fails to produce the desired effects. Its function in the bath, on the contrary, is rather unexplained; as general opinion, it is regarded as a conducting agent to stimulate the metal in the solution when the bath is old, low in metal, and in a state of foreign accumulated matter. A second belief or explanation is that phosphates create a buffer action that stabilizes or controls the metallic ions in the solution, which reduces or retards their rapid charge to the cathode, affording better and uniform color deposits. Some also term it as a

brightener. However, to the average plater, it is an indispensable requisite.

Potassium ferrocyanide is added to a gold solution when a dark or red shade of color is desired. Among other substances added to the solution are potassium nitrate, sodium sulphite, sodium bisulphite, and sodium hypo-sulphite. All four are termed brighteners. Their effect on flash deposits are not noticeable — only on thick or heavy deposits. Care should be taken in the use of sodium bisulphite as it reduces the free cyanide content of the solution.

It has been for a long period of time the belief that the presence of carbonates in a solution is very objectionable. This particular compounded radical is now recommended by a few electroplaters. It finds its way into the solution by way of commercial grades of gold cyanide, but almost always its greatest accumulation is formed automatically by way of precipitation from the cyanide vapors in heated solutions that combine with the oxygen of the air and the oxygen liberated at the anode during electrolysis. It can be noticed very easily that when an old gold solution contains a large amount of carbonates, a considerable amount of gassing is evolved at the anode. The use of a higher free cyanide content is always necessary when carbonates are present in the solution. A close checking of the carbonate content should be made, as an excess of carbonates produces cloudy dark or red deposits. It should, however, be stated that when a solution has accumulated an objectionable amount of carbonates, the solution should be discarded from service, and the gold recovered by some well-known method, or sent to a refiner.

Anodes of pure 24 karat gold, platinum, carbon, stainless steel or nichrome are in general use. All assure satisfactory results. The 24 karat gold and the ideal insoluble platinum anodes are losing favor due to high cost. Although the stainless steel and the nichrome anodes are slightly soluble in solution, they offer no deleterious effects in solution or on the deposit, and are now much in demand by a greater majority over the carbon anodes.

The range of the temperature in operating a gold solution is from room temperature 70° F to 200°F. The reason for so wide a range in temperature is due to the type of work to be plated. The cold solutions are less conductive and the color of the deposit obtained is of a pale shade. The moderate temperature of 140°F

can be applied in general to all gold solutions with satisfactory results. The hot solutions are more conductive and the color of the deposits in appearance are much richer in gold color than in the cold solution, but lend themselves to rapid and, at times, faulty operations. The extreme temperature of 200°F is only used for special work where deep recesses are to be covered or small articles in bunches or in baskets are to be plated. The free cyanide in such solutions is critical and should be maintained accordingly.

The current density used in the deposition of gold should be low, but on the contrary, gold solutions are operated at a voltage pressure of 0.5 to 15 volts that correspond to a current of 1.0 to 12 amps/ft.^{2} Again the fact can be mentioned that much depends on the character or nature of articles to be plated, the condition of solution, and color of deposit desired, that such a wide variation of current is applied. It is necessary that such particular factors be considered, and a suitable current then applied and adopted to bring about satisfactory results.

CHAIRMAN SMITH: You have heard the reading of this paper. Is there any discussion?

MR. HOGABOOM: I should like to ask the author what his experience has been as to the effect the color of the base metals has upon the finished article. In other words, if you deposit a certain amount of gold on silver, or the same amount of gold on brass, do you get the same color of gold in the finished article?

MR. OLDHAM: Yes, the color of the base metal does influence the color of the gold deposits. For instance, if we were to work with a mild solution, and plate an article of silver, the resulting deposit would appear to be light yellow with a green shadow. An article made of copper would yield a red gold tone, whereas work that is brass or green gold would acquire the natural gold color on the finished article. This, however, holds true for flash gold deposits only.

CHAIRMAN SMITH: Is there anyone else who wants to discuss this?

MR. L. C. CONRADI (Binghamton, New York): Are there any particular advantages you could list as to gold solutions with stainless steel anodes? Is that solution more easily controlled? For instance, if you have only intermittent gold plating — a

job now and then, can you use that solution without giving it much attention?

MR. OLDHAM: I would say, yes, you can forget your solution and let it stand for a while, providing you make some check on it regarding its formation and which particular reading should be respected more than another. That would be the cyanide. You can insert your stainless steel anode or nichrome anode and leave them in the solution. Stainless steel anodes or nichrome anodes are left in solutions at times overnight by quite a few platers. The gold anodes build up the metal content too high if they are used continuously during the average day's work. The average plater disregards such things because he has no correct record in keeping up his solution or the actual amount deposited on the article he has plated. The plater has more of a tendency to make closer and better checks if his gold is in solution, and he gets all of his gold from solution rather than applying it from anodes.

MR. C. R. FULFELD: I want to remark on the carbonate content of gold baths. I have had the same experience as mentioned, that high carbonates will produce red deposits. During the past three years I have operated one solution continuously and have taken care of the excess carbonates by precipitation with a hydrate. I found that to be very successful in the case of the solution. It has the value that gold solution has. I think it well pays for the cost of the chemicals. I just wanted to pass that information along.

Now, I would like to ask whether there is any relation between anode and cathode areas that give best results.

MR. OLDAM: Any relation?

MR. FULFELD: Between anode and cathode areas.

MR. OLDAM: I do not just quite understand you.

MR. FULFELD: What amount of anode area should you have for a given cathode area?

MR. OLDAM: The anode area should be about one-third or one-half of the cathode area. I should say that one-third of the cathode area is necessary to bring about efficient results.

CHAIRMAN SMITH: Are there any other questions?

MR. N. FLEET (New York City): How long would you say it would take to bring two metals of different colors to one shade of gold? By that I mean, if you have one piece of silver and another

piece of copper, about how long would they have to be in the bath to come out one color?

MR. OLDAM: A matter of seconds, possibly five to ten seconds at the longest, in high concentrated solutions. That is, the copper acquires a redder shade more readily than the silver, in low metal concentrated solutions.

MR. ARCHER: I should like to ask, first, if the gold content of the gold bath is an important factor in influencing the color, or are other constituents more important? Secondly, has there been any rapid method of determining the gold content, for instance, with the color-metric system?

MR. OLDAM: I will answer the first question. At all times we should maintain at least three to four or five pennyweight of gold per gallon, which is used by the average plater with a fixed temperature and current density so that uniform color deposits are obtained. Relative to the second question, I do not know of any rapid method to determine the gold content of the solution.

MR. HOGABOOM: Will you please differentiate between cold and hot solutions, how they operate for flash gold and heavy gold plate?

MR. OLDAM: Cold solutions are less efficient, and the color obtained is of a pale shade. The hot solutions are more conductive, and better colors are obtained for flash deposits. The cold solutions are seldom used in heavy gold plating. A temperature between 110° F. and 130°F is generally used for heavy gold deposits.

CHAIRMAN SMITH: Are there any more questions?

MR. GEORGE GIBBS (Bordentown, New Jersey): I should like to ask, in adding brightening agents, such as sodium bisulphite, if they are added in large quantities or small quantities.

MR. OLDAM: A quantity of one-sixty-fourth of an ounce possibly to one-half ounce is the customary amount to add.

MR. RODNEY OLSEN: We did not hear the question; we heard the answer.

MR. OLDAM: I believe the gentleman asked me what proportion or in what amounts are the brighteners added. He referred to sodium bisulphite. I, in turn, answered, one-sixty-fourth of an ounce to one-half ounce per gallon.

CHAIRMAN SMITH: Thank you, Mr. Oldam.

Here and There

The Detroit Branch Outing was everything that one could wish for. The attendance, enthusiasm, weather, sports, eats, and refreshments were perfect.

George Nankervis makes a splendid chairman for an event like this. We wish more of the A. E. S. members in all our branches had his willingness and enthusiasm to do things. Thanks, George, for the good time we had; your fellow members have good reason to speak well of you, and they do.

President Wilson tried his hand at all the games, even barnyard golf. "Red" might make a horse-shoe pitcher some day if he keeps practicing.

Ted Eichstaedt, the hard-working Secretary of the Branch, was the Reception Committee. Ted saw that everyone was provided for if they carried a red ribbon, the ribbon was worn to show that you paid for your ticket.

A lady plater in the person of Miss Fae Boris was one of the enthusiastic fans present at all the games and was she popular? Miss Boris is a member of Detroit Branch. She is acting manager of the Grand River Plating Co.

Ray Goodsell, second vice-president of the Supreme Society, drove all the way from Racine, Wisconsin, with his nephew Robert. Ray says the 1938 Convention plans are getting started nicely. He commented very favorably on the papers presented by the branches at the New York Convention, suggesting that the idea be carried out next year at Milwaukee. Let's start now to help him. Ray is one of the very fine members we have in Milwaukee Branch and to him has been given the chairmanship of the 1938 Convention.

Oh, boy! What beautiful prizes were given to the lucky winners, none of which cost over five dollars—well, maybe.

We wish we could call everyone we met by name but it can't be done. We were glad to shake hands with Jimmie Higgins, Mose Cherry, W. W. McCord, A. G. Spencer, etc., etc., before heading East. We also enjoyed the hospitality provided by President and Mrs. Wilson for a short time during our stay in Detroit.

In answer to requests from some interested parties in Buffalo, we stopped there on the way home to find out how much enthusiasm is being manifested towards starting a Branch of the A. E. S. there. Steps are being taken to sound out prospective members with this object in view.

We have received a card from our good friend, James W. Hanlon, Secretary of Chicago Branch, post-marked Hollywood, California. We hope Jim and Mrs. Hanlon had a nice trip and that they will benefit from their trip to the Coast.

San Francisco Branch has recently elected officers. There is every indication that many new members will be added to the membership list.

All our Branch Secretaries are asked to send their reports for publication in the REVIEW. Reporting the social and educational activities is a very important part of the Branch Secretary's office. These items are eagerly sought after by the other Branches. Will you not start now to place your own Branch in the limelight and at the same time be of benefit to others who may need your help?

Vacation is over. Let's go to work, by increasing our membership and by attending all the meetings.

MR. WALTER FRAINE RETURNS FROM FLORIDA

Mr. Walter Fraine has so far recovered from his recent illness that he has returned to his home from Florida where he spent several months recuperating.

We are all glad to know that Mr. Fraine is feeling much better and hopes to returns to work very shortly.

Enclosed in his letter was a check from the Union Trust Co. of Dayton for $242.06 as a 4th payment of the Research Funds from the above bank which is in process of liquidation. This brings the total recovery to 85%.

Mr. Fraine is hopeful that the entire amount that was tied up will be recovered.

MR. JOHNSON'S PAPER AS PUBLISHED IN THE JULY ISSUE

In all fairness to the authors of papers read at the educational sessions of the Conventions, we have usually mentioned their connection. In Mr. Johnson's paper entitled Films and their Relation to Cleaning Before Electroplating, we overlooked the name of his Company. Mr. Johnson is Technical Director of Oakite Products Inc., 22 Thames St., New York. We mention this because we have had some correspondence, asking us for Mr. Johnson's address.

Program for Detroit Branch 1937-1938

Mr. T. C. Eichstaedt, Secretary of Detroit Branch, sends us the following program of activities and speakers at the Branch meetings for the coming months. Other Branches might be inspired to follow Detroit's example and prepare their programs in advance.

September 10th

Mr. James W. Higgins, Chief Chemist, Packard Motor Car Company, Detroit; "A Brief Resumé of Technical Paper Presented at the June Convention."

October 1st

Mr. Walter S. Pinner, Electro-chemist, General Spring and Bumper Corporation, Detroit; "Experiences in Evaluating Plated Coatings."

November 5th

Mr. Vincent Mattacotti, Hanson-Van Winkle Munning Co., Chicago; Subject to be announced.

December 3rd

Mr. Floyd F. Oplinger, E. I. Du Pont de Nemours & Company; Subject to be announced.

January 7th

Mr. Wm. M. Phillips, General Motors Corporation, Detroit; Subject to be announced.

February 4th

Dr. Junius D. Edwards, Ass't Director of Research, Aluminum Corp. of America; "Big Jobs for Thin Films."

March 4th

Mr. George A. Spencer, President, Crown Rheostat & Supply Company, Chicago; "The Cost of Making a Profit."

April 1st

Dr. H. H. Harkins, Director of Development, U. S. Rubber Products, Inc., Passaic, N. J.; "How Rubber Cuts Corrosion Costs."

May 6th

Mr. Gustaf Soderberg, Director of Research, The Udylite Company, Detroit; "Improvements in Copper Cyanide Plating."

Business and Social News

BRANCH NEWS

Educational Activities

AMERICAN ELECTRO-PLATERS' SOCIETY

ANDERSON BRANCH

Anderson Branch of American Electro-Platers' Society met for a business meeting July 26, 1937 at the Y.M. C. A. with George Onksen, Sr., President, in charge.

Minutes of the last meeting were read and approved. All officers of the Society were present for Roll Call.

The Secretary of the Anderson Branch was instructed by the President to communicate with Wm. M. Phillips, Chairman of the Research Committee of the Electro-Platers' Society, advising him of the communications with various manufacturing firms in our district who might be interested in making donations to the research committee.

Much interest was shown in the discussion on the advisability of starting another educational group during the fall and winter.

Librarian R. M. Wagner agreed to give the plan his very earnest consideration and have a report for us by the next meeting.

Preparations for the next meeting of the Society were discussed, said meeting to be held Saturday afternoon and evening, September 11, 1937, at the Guide Lamp Shack. Committee in charge of arrangements were George Berg, Chairman; R. M. Wagner, Otto McCallister, Charles Hauri, and R. B. Phillips. A motion made by R. M. Wagner, seconded by L. R. Hinsch that the Branch appropriate $25.00 for the expense of the meeting — motion carried.

The meeting was then turned over to R. M. Wagner, Anderson-Delegate to the National Convention who gave a very interesting report on Convention papers and business meeting.

Meeting adjourned at 9:00 P. M.

R. B. PHILLIPS, *Sec.*

NEW YORK BRANCH

The New York Branch held the first of their Summer schedule of meetings on July 23rd at the Conference Rooms at the Hotel Pennsylvania. The Branch will hold but one meeting per month during July, August and September, the same to be held on the fourth Friday of each month.

The July meeting was devoted to Branch business and local affairs. A report was made to the Membership on the past Silver Jubilee Convention by the General Chairman, F. J. MacStoker. The report indicated a successful Convention and it was hoped and believed that the Society as a whole felt the same way about it. At this time the New York Branch wishes to express its feeling of gratitude to all the other Branches and individuals who so substantially co-operated in the matter of progressing the Silver Jubilee at New York.

There was one application for membership and one election to membership at this meeting, which was adjourned at 11.00 P. M.

H. A. PAINTER, *Recording Sec.*

CLEVELAND BRANCH

The monthly meeting of the Cleveland Branch A.E.S. was held Sat. Aug. 7th at Hotel Cleveland. Our President,

Mr. Wm. Scott presided. Meeting called to order at 8:30.

Mr. Edward J. Esner of the Apex Mfg. Co., Cleveland, Ohio was elected as an active member.

As there was no July meeting our convention committee reported.

Our Clam Bake Committee has everything just about set. It will be held some time in October.

The proceedings of the recent convention in New York furnished the principal topic of discussion.

The September meeting will be the second Saturday instead of the first.

Meeting adjourned 10:00 P. M.

CHARLES F. OTT, *Sec.*

Boston Branch had a Very Successful Outing

Boston Branch held its second annual outing Saturday, August 14th at Seiler's Ten Acres, Wayland, Mass.

Over one hundred members and their families attended and had a very enjoyable time.

In the afternoon sports of all kinds were held including a ball game and swimming, the ball game was between the married men and the single men. I don't know who won; you can ask Ed. DeLorme—he got tired trying to keep the score. With Charlie Hardy on second base he let all the balls go by him and Arthur Mintie helped him out on first base; anyway who could win with Al. Baker and his gang? They bought out Hardy, Mintie, and Lack to throw the game.

We had all our standbys with us, including Bob Leather, Earl Couch, and John Oberender. Bob has extended an invitation to the members of the Branch to attend his Stag Party and Outing September 18th at his farm down at Bethlehem, Conn. The name of his place is Leacrest.

EXPERIENCED ELECTROPLATERS
prefer
ANACONDA
Copper Anodes

... because their unexcelled purity assures uniform corrosion, the highest quality deposit in the shortest possible time and low scrap losses. Furnished with suspension holes drilled as desired, or tapped for end hooks.

ANACONDA

THE AMERICAN BRASS CO.
General Offices, Waterbury, Conn.
Offices and Agencies in Principal Cities

The horse-shoe pitching exhibition was given by Carl Larsen, the Greater Boston Champion and with him were Frank Bristol and George Loeser, the latter a member of Boston Branch. All these men belong to the Fells Horse Shoe Club of Melrose, Mass. Their pitching was the finest seen around here for many years; every time the shoes landed they stayed right inside the pin. Bob Leather liked the performance so well that he invited the Champs to attend his party also.

After the sports all sat down to one of those Seiler's famous dinners with plenty to eat. There was a race on to see who could eat the most and as usual Charlie Hardy won; we don't know where he put it all, but we'll bet he ate no dinner Sunday.

The committee did a fine job and

everybody had a good time. We hope to meet all those that helped make this outing a success at our annual banquet.

A. W. GARRETT, *Sec.*

DETROIT BRANCH

Saturday, August 14, was a fine day in every way in Detroit, Mich., for Detroit Branch held their outing at Sandy Mac's Golf Course, 8415 Tireman Ave., Dearborn, just outside of Detroit city limits. The weather was made to order; it was a clear hot day, just the right sort of a day to keep the "taps" running. And believe me, they were kept going all day. Every one present and there were 164 men and one woman attending, had a good time. W. J. R. Kennedy, our Executive Secretary, of Springfield, Mass., Mr. Ray Goodsell, Supreme 2nd Vice-president, of Milwaukee, Wisconsin, were also present. With these members of the Executive Board and our own President, A. B. Wilson, being Supreme President, the Executive Board was well represented and Detroit Branch felt highly honored by having them visit here on our outing and we hope they had a real good time.

WANTED

High Price Paid for your Worn Out Buffs

Submit Sample

MICHIGAN BUFF CO., INC.

4054 Beaufait Ave. Detroit, Mich.

There were games and contests and races going on all during the day, and prizes for all of them. These prizes were donated by the Local Supplies of Electro Plating Equipment and they were all worth at least five dollars each, so they were worth while. Detroit Branch feels grateful to these supply houses for their donations and takes this means of letting them all know that we appreciate their generous co-operation.

I will not go into detail on all the contests but will mention a few which seemed to be very popular.

Naptha and Brushing Eliminated!

A large tool and equipment manufacturer was using naptha to remove cutting oil and chips from cast iron and steel parts.

These parts are now cleaned with MAGNUS No. 78 (a new product), then simply rinsed. Not only is the dangerous fire hazard eliminated and better cleaning results obtained — but the labor of brushing the cast iron parts is likewise done away with. Another feature is the fact that the cleaner is used at room temperature, eliminating all need of heating for the cleaning operation.

Without obligation, we'll gladly send you a drum of this material on trial. Our money back 30-day guarantee fully protects you.

MAGNUS CHEMICAL COMPANY
41 South Avenue Garwood, N. J.

MAGNUS CLEANERS

The Golf Ball Driving Contest of which Mr. Buckingham of Buckingham Products Company of Detroit had charge, and he did a good job of it. The Horse Shoe Pitching Contest of which Mr. Sampson, Jr., had charge was very popular among all the boys. And then we had a Soft Ball game between a team made up of some real good players, not having two teams evenly matched. The boys of the J. C. Robinson Plating Company Team took charge and split up and chose others present to make up the teams. They had a real good game. Mr. Chester Southwick was supposed to have had charge of this game but he was too busy keeping the taps running to pay much attention to the scoring or playing of the baseball game.

Mr. Beverly Boyd took charge of the prizes and the awarding of them to the winners and he did a very fine job of it. Mr. George L. Nankervis of Fredric B. Stevens, Inc., was Chairman of the arrangement committee and did a wonderful job of it. Detroit Branch is fortunate in having such a man to act in such a capacity and he did himself proud, and we, Detroit Branch, wish to express appreciation for his services, and we will bear him in mind for chairman of our banquet committee for the coming winter.

While it was a stag affair, we had present as mentioned before, one woman, Fae Boris, who is acting General Manager of the Grand River Plating Co., and she enjoyed it very much. Jimmie Higgins I know enjoyed having her present as did quite a few of the others present, especially some of the salesmen of the supply houses.

All together every one expressed themselves as having had a wonderful time and are looking forward to our next social function of the winter which we expect to be "*some affair.*"

Detroit Branch had no meeting in July or August. Our next meeting will be September 10, second Friday in September. After that date Detroit Branch promises to have its regular meeting the first Friday of each month and then watch Detroit Branch reports in the REVIEW and see it grow in membership.

T. C. EICHSTAEDT, *Sec.-Treas.*

PHILADELPHIA BRANCH

Philadelphia Branch will hold a meeting at Reading, Penna. on September 17, 1937 at the Union Fire Depart-

Important to the Electroplating Industry

PERMAG Cleaning Compounds, supported by Magnuson Service never back down on jobs for electro-platers.

We've had the hardest cleaning problems ever known put up to us—and we solved them. If anyone in the industry, today, has a tough cleaning job, tell us. No obligation.

MAGNUSON PRODUCTS CORPORATION
THIRD and HOYT STREETS, BROOKLYN, N. Y.
Manufacturers of Specialized Scientific Cleaning Compounds for Industrial Purposes
Warehouses in principal cities throughout the U. S. Representatives from coast to coast
Canadian branch. Canadian Permag Products Ltd. Ottawa and Queen Sts., Montreal, Can.

ment Hall; 17th St. & Perkiomen Ave. and will be addressed by Mr. Dwight Overcash of the Brown-Lipe-Chapin Division of the General Motors at Syracuse, New York. Mr. Overcash has promised to speak on Bright Nickel and since he has been running several thousand gallons each of two different types of bright nickel on heavy automatic production; he should be able to tell us in a non-technical, practical way of the methods of operation, analysis, control and cost employed by him. At the same time, he will attempt to answer all technical questions for those who wish as he is well fitted to do by his training and experience. Moreover, he will be glad to give you his experience with Korolac covered racks which the Brown-Lipe-Chapin Division were one of the first to use and probably cover as many per day as any single plant in operation.

Busses will leave Broad Street and Erie Ave. in Philadelphia promptly at 6.00 P. M. Friday, September 17, at a cost of 75c per person for the round trip to Reading. Kindly notify Mr. John L. Nelson, 1617 North St., Philadelphia, Penna. of the number you intend to have in your party so that he may have adequate bus service and sufficient musical talent for each bus which he has so kindly offered to supply en route.

Upon arrival in Reading; both solid and liquid refreshment will be served without cost; and the meeting will be called to order promptly at 8.30 P.M. Door prizes will be given to fortunate ticket holders. The committee has done everything to make this a gala event. It wishes that all members who can will try to attend this meeting.

The October meeting will be held at the Harrison Lab. U. of P. 34th & Spruce Streets, Philadelphia, Penn. at which time Mr. Daviss of the R&H Chemicals Dept. will deliver a lecture on Color Photography, October 15, 1937, 8.00 P. M. It is very fortunate that we are able to have Mr. Daviss at this time. This should be a very interesting and educational lecture. We should have a large attendance.

There will be a special meeting of Philadelphia Branch, December 9, 1937 at Temple College Hall, 1831 N. Broad Street, Philadelphia, Penna., Room C-100, for the purpose of acquainting the members and the several manufacturers of the work done and the work being done by our research committee. The meeting will be addressed by one we always welcome to Philadelphia Branch — Dr. Blum. He will have a very interesting message for us at this time. More will be said of this later.

The Banquet Committee has arranged for the Educational Session and Banquet for November 20, 1937 at "ADAM'S", 13th & Spring Garden Streets, Philadelphia, Penna. This should be a very enjoyable affair as the committee has a good many surprises for all who attend. There will be more reported about this in the next issue of the REVIEW.

ROBERT E. JACKSON, JR. *Sec.*

POLISHING

BUFFING and PLATING

of all kinds

A. A. BRUNELL ELECTROPLATING CO.

370 Park Avenue
Worcester, Mass.

Tel. 2-7595

GOOD WORK PROMPT SERVICE

PRESIDENT UNDERWOOD'S LETTER

Electroplating is our living wherefor we should exert ourselves and contribute all that we have for the advancement of the science. This can best be accomplished by joining with those progressive Electroplaters who have been attending classes for the past few years. Last year these men completed the first independent investigation of an electroplating solution ever conducted by such a group. The results of this research will be reported in the A. E. S. Convention Proceedings, June 14, 1937.

Few, if any of us, realize that the Philadelphia Branch Electroplaters' Class is now an IMPORTANT INSTITUTION spreading its influence and commanding recognition from all Branches.

To all progressive Platers an opportunity is afforded to become familiar with the following new instruments: A new 6-volt Rectifier; 6-volt Generator Set; a Potentiometer for measuring pH, etc.; a Coulometer; a Gotham Cell; a Haring Cell and a Projector with an Electrolysis Cell. Where?

AT THE JULES MASTBAUM VOCATIONAL SCHOOL

In the past four years we have been conducting an elementary course in chemical analysis for electroplaters and electrotypers. Members of the class have obtained laboratory practice in volumetric analysis and have learned to analyze fifteen or more different plating solutions.

We are now prepared to take up the electro-chemistry of plating. Therefore we are giving a purely lecture course with demonstrations in electrochemistry as applied to electroplating and electrotyping. The lecture course will be given one evening a week for two hours. A laboratory course of two evenings a week will accompany the lecture course. Persons may register for either lecture or laboratory course, or both.

Please note that these courses are prepared for adults and the lectures are so simplified that no previous training is necessary.

A registration deposit of one dollar ($1.00) is charged and is returned to all pupils who attend 75% of the sessions. A laboratory fee of fifty cents ($0.50) is also charged. This fee is not returnable.

The teacher is an electrochemist, a practical electroplater, and a graduate of Temple College.

Registration will be on September 13, 1937, at the Jules Mastbaum Evening Vocational School, Frankford Avenue and Clementine Street, Philadelphia, Pa.

This course has been endorsed by the Philadelphia Branch of the American Electro-Platers' Society.

OTHER ACTIVITIES

YEARLY MEETING AND BANQUET, Nov. 27th, 1937, at Adams, 13th and Spring Garden Streets, Philadelphia, Pa.

POPULAR LECTURE ON RESEARCH, by DR. BLUM, Dec. 9, 1937. Temple University College Hall, 1831 N. Broad Street, Room C100.

JOE UNDERWOOD, *President* August 18, 1937

SAN FRANCISCO BRANCH

At the August meeting of the San Francisco Branch of the American Electro-Platers' Society held at Hotel St. Mark, Oakland, the following were elected officers: *President*, Lawrence Miller, Enterprise Plating Works, 780 22nd Street, Oakland, California; *Vice President*, W. C. Jacobsen, Marchant Calculating Machine Works, Powell and Landregan Sts., Emeryville, Calif.; *Secretary-Treasurer*, J. C. McCallum, Marchant Calculating Machine Works, Powell and Landregan Sts., Emeryville, Calif.; *Librarian*, Nicholas Bisbiglia, Occidental Plating Works, 6602 San Pablo Ave., Oakland, Calif.; *Board of Managers*: L. A. Delamothe, Oakland Plating Works, 517 18th St., Oakland, Calif.; Joseph Levoy, L. H. Butcher Co., 15th and Vermont Sts., San Francisco, Calif.;

J. C. McCallum, Marchant Calculating Machine Works, Powell and Landregan Sts., Emeryville, Calif.

H. W. MCKIBBEN,
Secretary Pro Tem.

CHICAGO BRANCH

Chicago Branch held a picnic at Antioch, Ill., Charmaine Resort on Sunday, August 22. While the day was cool, there were 126 men and 300 women and children present. The kids sure had a good time racing for the prizes and the grown-ups had a good time watching them. Nearly every family got a prize either in competition or on the drawing.

The beverage bar did a very large business and the kids ate 500 ice cream cups and drank 13 cases of Pop.

There were two ball games, one for the young members of two teams and one for the older members and the married men and both were enjoyed by the crowd. The picnic was voted a success by all that attended.

J. W. HANLON, *Sec.*

ST. LOUIS BRANCH

Regular meeting of the St. Louis Branch A.E.S. was held Friday, Sept. 3, 1937, at the Central Y.M.C.A. Dinner was served at 6:15.

Roll call of officers showed two absent. Minutes of previous meeting were read and approved.

It was with regret that Secretary read a letter from Wm. J. Flannery stating he wishes to resign. Bill has been one of our old stand-bys and a member for some time. We all wish him back.

Delegate made a report of the Convention and a discussion followed.

This being the first meeting this year, Librarian was asked to line up the program for the coming year.

USED BUFFS FOR SALE

64-68—1⅛" arbor—20 ply

Full Disc - Loose - or Sewed

Thousands of every size

8"—8¢ each 9"—9¢ each

10"—12¢ each

MICHIGAN BUFF CO., INC.

4054 Beaufait Ave. Detroit, Mich.

Question was asked, how to stop spotting out on Steel Wire after Cadmium plating. Would submit sample at next meeting.

Meeting adjourned at 9:15 p.m.

Next meeting will be the first Friday in October (1st) at Central Y.M.C.A., at 16th and Locust.

Borden C. Wright was the guest of honor at a dinner tendered him by the Musick Plating, Inc., 206 S. 9th St., St. Louis, Mo., on August 14, to celebrate his 50th anniversary in the service of the company.

Mr. Wright, who at the age of 18 took a "temporary" job with the Musick Plating Co., Inc., has not missed more than one week's time since then because of illness. Since starting on his "temporary job" he has worked in every department of the plant. He still wears overalls and hustles as fast as any boy or man in the organization. He states that he is good for 25 more years as foreman of the Special Finishing Dept.

Mr. Wright was presented with a gold placque by E. J. Musick, president of the company, from the officers and employees, as a token of their esteem and friendship.

C. T. MCGINLEY, *Sec.*

ROCHESTER BRANCH

On Saturday afternoon, August 14, 1937 the Rochester Branch held its Joint 2nd Annual Picnic with the Binghamton-Elmira Branch at Corbett's Glen in Rochester. The attendance was very gratifying. The first event on the afternoon's schedule was a baseball game which was thoroughly enjoyed by both the players and the audience. After the game, races were run off in which all, both young and otherwise participated. Liquid refreshments were served during the major part of the time and at 5 o'clock dinner was served. Shortly after the dinner the party broke up, everyone voting it a huge success. Austin Fletcher left with the admonition that next year the picnic shall be held at Binghamton. The committee in charge, Mr. Frank Kohlmeier, Ray Berghold and Fred Glitzer deserve a big hand for the competent way in which the picnic was run.

JUDSON R. ELSTER, *Sec'y.*

MILWAUKEE BRANCH

After omitting the August meeting, the Milwaukee Branch started into its fall season on Sept. 9., at Lipps Hall, and a very good group of active members was on hand. The usual order of business was omitted, and the evening was spent profitably answering questions, and having a general discussion.

Q. How to keep zinc plated articles bright?

There was much discussion on this subject, and it has probably not been settled into a standard procedure anywhere yet. The Milwaukee members would appreciate any information on this subject.

Q. How to plate without using an acid dip?

A. One of the local members is doing this with a great many steel parts, and he attributes his success to using a hot rinse after his alkaline cleaning. He claims that the adherence of nickel and chromium on top this layer is excellent.

Q. How to get rid of an excess of gum arabic in a nickel solution?

A. Add 1/10; of 1% of 100 volume Hydrogen peroxide to the solution, stir vigorously, drop pH to about 5.0, stir and then operate with dummies for at least two hours. Raise pH 6.2 to 6.4, and then the solution should be operable.

This has worked in several instances, and cured a lot of grief.

Three new members were elected into office during the meeting. Morton C. Frost of Kenosha, Wis., associate member: Louis O. Jorgensen of Kenosha, Wis., active; Clarence F. Anderson of Kenosha, Wis., active. Two men made application for membership. John L. Northrup of the Chamberlain Corp., of Waterloo, Ia.; as an associate member and Clayton L. Finch of the Kohler Co., Kohler, Wis., as an associate member.

The Milwaukee branch is having a purely business meeting next Thursday evening, at which time all the Chairmen for the various committees for the 1938 Smoker will be announced. The local branch is planning on making our convention one that will be long remembered.

A. J. HERMANSEN, *Sec.-Treas.*

McKEON'S

"Liquid Sulphur"

"The Oxidizing Agent of Today"

for oxidizing Copper and Silver. Special cooperation in helping you oxidize Brass. Sulpher Products Co., Greensburg, Pa.

SAMPLE FREE ON REQUEST
Wilfred S. McKeon, President.

GRAND RAPIDS BRANCH

Our first meeting of the fall season was an open meeting, held September 9, in the air-conditioned house and basement of Maas and Waldstein's representative, Chas. O. Werft.

The meeting was largely attended by platers and superintendents of Plants of Grand Rapids, Zeeland, Grand Haven and Kalamazoo.

After our regular business meeting was over, questions were asked and answered, these questions accumulating since our last meeting in June. All present entered into the discussion that followed.

Then our Host, after the proper "Pass Word" conducted those present to another part of his basement where refreshments that are in order for these very hot days were served.

Grand Rapids territory for additional members is limited, but we all are doing our best to increase the membership.

Our regular meetings at the Y M C A are well attended, and we can candidly say we have no member on our roster who does not enter into the discussions of the evening. We have no wall flowers in this Branch, all take an active part in making each meeting successful. The officials of this Branch are thorough and conscientious men, who try to give each member present at the meeting something to take home and study, and thereby make him a better craftsman in his profession.

Mr. Werft gave a talk on new products on the market, such as plate-lustre, a material that produces a plated or oxidized finish and new synthetic enamels, also Bronze powder finishes where plating is not adaptable. A talk on color plating, an article read by our Librarian, Protein. Mr. Werft's talk was well received and discussed. Very interesting questions were asked and while our Librarian was not thoroughly acquainted with the process, he distributed literature on this Process to the members present. It was the census of opinion that this process is well adapted to automobile and refrigerator hardware.

CHAS. S. WHALLEY, *Sec.-Treas.*

WATERBURY BRANCH

The regular meeting of the Waterbury Branch was held Friday Evening, September 10th, at the Elton Hotel. Regular meetings in the future will be held in the small dining room of the Elton Hotel.

Mr. E. T. Candee was unanimously elected Secretary-Treasurer to replace Mr. William F. Guilfoile who died recently. Mr. Earl Couch was unanimously elected Librarian.

The Branch voted to set aside a maximum of $50.00 each year to partially defray Convention expenses of the President or any delegate he may designate.

It was also moved to write a letter to Mrs. William F. Guilfoile to express the condolences and appreciation of the Branch to her.

It was decided to hold a banquet this Fall, the last of October or the first of November. Most of the balance of the evening was spent in discussing plans for this Convention. President Elwin appointed the following committee to prepare the details of the Convention: E. T. Candee, *Chairman*, R. D. Crane; J. Muscio; W. F. Gray, T. Elwin; L. E. Lougee.

The Branch voted to notify Librarian Couch that we wish to have a speaker at each meeting and that if necessary to obtain a good speaker it would be satisfactory to defray part of his travelling expenses.

E. T. CANDEE, *Sec'y.-Treas.*

The Abstract Section

R. M. GOODSELL, *Chairman, Program and Educational Committee*

Chromium Plating from Non-Chromic Acid Solutions with Chromium Anodes. M. SCHLÖTTER, *J. Electrodepositors' Tech. Soc.* preprint of Inter. Conference, 1937 — In solutions of chromium chloride or sulphate, chromium anodes tend to dissolve as hexavalent chromium, that is, to form chromic acid. By using a combination of direct and "superposed" alternating current, the chromium can be made to dissolve in the desired trivalent state. Chromium can then be deposited from the chromium sulphate bath at 60 amp/ft^2 at 68° F. In general, the throwing power is no better than in the regular chromic acid bath. W. BLUM

Electrolytic Coating with Lead without Immersing in the Electrolyte. N. P. FEDOTIEFF, B. P. ARTAMONOFF and N. J. RASMEROVA. *J. Electrodepositors' Tech. Soc.*, preprint of Inter. Conference, 1937 — Brush plating of lead is accomplished from a fluoborate solution. The anode tool or brush is made of hard rubber, with a suitable fiber brush in one end. Granulated lead is held in a cavity in the brush holder, through which the solution flows. Current densities as high as 3000 amp/ft^2 may be used on the small area covered by the brush, but a potential of about 40 volts is required. For plating about 1 square yard at 1000 amp/ft^2 on a brush with an area of about 50 in^2, it requires 1 hour to deposit 0.004 inch of lead. As continuous hand labor is required, production of thick coatings is not profitable. W. BLUM

Bright Nickel Plating (A RESUME OF TECHNICAL LITERATURE). L. W. JOHNSON, *J. Electrodepositors' Tech. Soc.*, **12**, 93, 1937 — The earlier bright nickel solutions which contained cadmium salts or organic additions are discussed. The principal features of recent United States and British patents on bright nickel are summarized. W. BLUM

METALS AND ALLOYS

1. Cleaning and Finishing Buick Automotive Parts, *Industrial Finishing* — Vol. **12**, Nov. 1936, pp. 20 - 24. J. B. NEALEY — Automobile parts at Flint plant of Buick Motor Co. that are to be sprayed with lacquer are first Bonderized and then dried in gas ovens. A substitute process known as "Chromodine" is designed for parts subjected to bending after japanning. Cleaning procedures are given. PHIL J. RITZENTHALER.

2. Cleaning and Priming Galvanized Iron and Zinc Coated Metals. *Industrial Finishing*, Vol. **12**, Oct. 1936, pp. 14 - 16. GEO. A. ENDOM — A practical review of the troublesome factors that must be eliminated prior to enameling. Discusses importance of cleaning and drying and advises parts be primed as quickly thereafter as possible. Recommends iron oxide or zinc chromate primer, and for a finish coat any synthetic enamel or as a second choice, an oil base enamel. Lacquer enamels seem too brittle for Zn coated metals.
PHIL J. RITZENTHALER.

RELIANCE POLISHING LATHES

Two Speeds at No Extra Cost.

Three Speeds Special.

Spindle Brake, with Auxiliary Shut-off Switch.

Straight or Overhanging Type.

Flat Top for Shelf Space.

Made for motor drive or belt drive; single spindle or double spindle; pedestal type or bench type. All sizes.

CHAS. F. L'HOMMEDIEU & SONS CO.

Manufacturers

COMPLETE PLATING PLANTS INSTALLED

CHICAGO

General Office and Factory
4521 Ogden Avenue

Sales Office
13 South Clinton Street

Dealers in Principal Cities — Branches: Cleveland & Los Angeles

3. Superficial Attack of Base Metal before Electrodeposition. V. P. SACCHI, *Ind. Mechannica*, Vol. **18**, Dec. 1936, pp. 757 - 62. Review plus original research. The customary chemical or electrolytic pretreatment of surfaces to be electroplated is believed to aid adhesion not so much through many cavities produced but by removal of the *amorphous surface film* in presence of which no deposit is possible. Structural characteristics of the transition zone are described at length with micrographs. PHIL J. RITZENTHALER.

4. Application of Electrolytic Polishing in Study of Metal Deposits. PIERRE JACQUET, "*Comptes Rend*," Vol. **204**, Jan. 1937, pp. 172 - 74 — Experimental work with discussion. Author refers to earlier work on electrolytic polishing which does not distort surface. Electron Diffraction studies showed the first areas of metal deposited on the cathode to be influenced by grain boundaries, crystallographic planes and dendrites in the cathode structure. PHIL J. RITZENTHALER.

Tin Plating (?) Aluminum Alloy Pistons. DALE BROWN, V. SHULNBURG and G. DELL. *Automotive Industry*, Vol. **75**, Dec. 1936, pp. 884 - 6 — Practical Article. Tin plating of alloy pistons by immersion in sodium stannate solution is described. The process includes: (1) 3 second dip in 6 oz. gal. magnus cleaner at 175-185° F. (2) cold water rinse, (3) 1 second etch in 20% nitric acid at room temperature, (4) repeated step (2), (5) 3 - 5 min. in 6 oz./gal. sodium stannate plating bath at 175-180° F, (6) cold water rinse, (7) dry in hot water. Excessive high temperatures of cleaning or plating baths cause blisters. Free alkali in the plating bath must be neutralized for the same reason. PHIL J. RITZENTHALER.

Barrel Burnishing of Metal Products. H. LEROY BEAVER. *Product Finishing*, Aug. 1937, pp. 22 - 30 — Article No. 7 in a series on Ball Burnishing. Discusses the analysis of a burnishing problem, including design and engineering consultations when considering burnishing a new piece. Recommends $\frac{3}{32}$" filets instead of square angles and sharp corners. This incidently, will reduce die wear. It was found that the harder the material the better the burnished finish will be as regards luster. Material of Rockwell "C" scale hardness will in general have a better luster than "B" scale material. Most economical to remove burrs by preventing occurrence through die changes and correct hardness of material. The use of correct handling methods on stampings previous to burnishing is emphasized; using canvass baffles to prevent scratching as parts fall from press. Discusses cleanliness of work, size of loads and materials used. Many practical pointers given. PHIL J. RITZENTHALER.

Barrel Burnishing of Aluminum. From the Question Box of *Die Metallwaren-Industrie und Galvano-Technik*. Vol. **34**, Dec. 1936; Page 474 — It is possible to barrel ball burnish small articles of aluminum to a high polish, but more precautions must be taken with the operation than when burnishing brass or steel. The burnishing barrel should be lined inside with wood which does not contain any resinous or gummy materials. Just as in hand polishing, the barrel burnishing is more rapid the greater the polishing pressure and hence, the barrel should be so constructed that a high pressure can be obtained from the weight of the polishing ball and therefore, the diameter of the barrel should be, if possible, greater than the length.

The Champion DELIVERS *in the* PINCHES!

WHEN there are men on the bases, two out, and a hit needed to win the game, it is a comfort to the home rooters to know that the champion batter is next up, because a champion usually delivers in the pinches.

There are champions in industry, as well as in athletics, and EGYPTIAN LACQUERS have been numbered among these champions for over a half century. Day after day, year after year, they are delivering in the pinches. EGYPTIAN FINISHES can be depended upon.

When you are next in the market for any type of finish, ask us for information regarding it. There is no obligation on your part. We will appreciate the opportunity of showing our wares.

THE EGYPTIAN LACQUER MFG. CO.
LACQUERS · SYNTHETICS · PAINTS · VARNISHES
ROCKEFELLER CENTER · NEW YORK, N.Y.

The polishing ball must be entirely smooth and brilliant as any nicks, rust particles, etc. will prevent the formation of a good burnish on the aluminum. Extreme cleanliness must be used throughout the entire operation for the polishing balls, the burnishing barrel and the work to be burnished. The burnishing soap must be neither alkaline nor acid, as it will react with aluminum if it is not neutral. If possible, soft, lime-free water should be used to prevent formation of insoluble calcium soaps. These insoluble soaps may be prevented by the addition of sodium metaphosphate (Calgon). Surface depressents such as alkanol B may be used in place of soap. After the work has been burnished to the proper brilliance, the washing should be done by pouring the work out on to a sieve rather than attempting to wash in the barrel, selecting the meshes of a the sieve so that either the balls or the work will go through the sieve effecting a separation.

The sawdust used for drying should be thoroughly dry and free of resinous material. W. R. MEYER

Antique Patinas on Copper and Copper Alloys. (Grünfärbung von Kupfer und Kupferlegierungen ((Antikpatina)) Anonymous. *Die Metallwaren-industrie und Galvano-Technik*; Volume **34**; 1936; Pages 469-70 — The author reports an investigation made on the various materials which may be used to produce green colors on copper or copper alloys. Over 40 different ammonium, potassium, and sodium salts, as well as various acids were investigated. When the article can be heated, copper nitrate is the best material to produce a patina color, but it is not satisfactory when the colors must be produced in the cold. Diammonium phosphate gave a very adherent bright blue-green patina. The greater value of copper nitrate over copper carbonate, copper chloride and copper sulphate is understandable when you consider that the structure of basic copper nitrate is a plate-like structure, giving good coverage, whereas basic copper carbonate is granular, basic copper chloride is finely granular and basic copper sulphate is needle-like in structure.

The author found that ammonium butyrate produces a beautiful blue-green adherent patina in a very short time, but its chief objection is the vile odor of this chemical. The operation and disadvantages of the rapid patina of the method of patina production of Freemann & Kirby is described (*Metals and Alloys*; 1932, Page 190-95) and it is pointed out that the ammonia content of their solution must be strictly controlled to attain the adhesion of the patinas and the proper color. W. R. MEYER

The Chromium Plating of Cutting Tools. A. THIBAUDAT. *Galvano* (Paris). March, 1937, page 21—Reviewing previous articles advocating the application of chromium plating to cutting tools, the author quotes statements that alloys of steel high in nickel and chromium are difficult to plate wih chromium, and that steels containing more than 1% manganese or more than 5% tungsten cannot be so plated. Since high speed steels cannot be plated, then the metallurgist must develop a steel of proper qualities that can be chromium plated before a successful application in this field can be made. The problem of plating sharp edges without burning the deposit on them also needs further consideration. C. T. THOMAS

MEAKER

PROCESSING EQUIPMENT

Designed and built by practical plating engineers . . . to fulfill your particular requirements for modern efficiency and economy.

Full Automatic Plating Machines (Return Type • Straight-Away • Midget).
Semi-Automatic Plating Machines.
Meaker-Electric Products Generators.

4th edition of "Practical Plating Pointers" just off the press. Send for your copy.

THE MEAKER COMPANY
1629-41 S. 55th Ave. (Cicero Station) CHICAGO, ILLINOIS

VICE PRESIDENT AUSTIN FLETCHER SENDS A MESSAGE

The interest being shown at this time, in the branch and individual exhibits for the Convention in Milwaukee makes us feel safe in predicting the largest exhibit of plated ware ever shown at any time.

But the interest is in the same branches and with the same individuals who have made the exhibits what they were these past years. This year we want every branch represented and if possible every plater — whether he is plating battleships or needles — he should be represented.

We are asking each Branch to have a committee to work with this office and with the Milwaukee Chairman in collecting the work. The larger the committee the better, and it is believed that a salesman who meets all the men in the Branch would be an asset.

If possible we would like the committee in each branch to volunteer. With such a committee we will go places.

Will the men who are interested in seeing their branch represented send in your name, address and Branch to Austin Fletcher, 22 Blanchard Avenue, Binghamton, N. Y., before October 1st?

Beginning the work for the Convention brings to mind some of the past conventions and particularly the lack of plant visitations. Are we to lose sight of the fact that plant visitation is as important to a platers convention as the papers read?

Manufacturers are underwriting our expenses to attend these conventions and are entitled to an honest return on their investment. I venture to predict that if we continue to ignore the value of plant visitation the nearest many of us will get to a convention will be the reading of the proceedings at some future date.

Announcing...

ANALYTICAL SETS for

ZINC and CADMIUM

Combined Sets for Metal Content, Sodium Cyanide, Sodium Hydroxide and Sodium Carbonate are easily and quickly operated....direct reading

WRITE FOR LITERATURE

KOCOUR CO.

4725 S. CHRISTIANA AVENUE, CHICAGO

Complete Sets for Chromium—Nickel—Copper—etc. Solutions Colorimetric, Quinhydrone and Glass Electrode Systems for pH

* * PIONEERS IN CONTROL SETS FOR THE PLATER * *

Clean

with

METEX

Two developments that warrant your investigation

METEX CLEANER 1-W

METEX CLEANER #9

Technical Information upon Request

MacDermid Incorporated

WATERBURY CONNECTICUT

VICE PRESIDENT AUSTIN FLETCHER SENDS A MESSAGE

The interest being shown at this time, in the branch and individual exhibits for the Convention in Milwaukee makes us feel safe in predicting the largest exhibit of plated ware ever shown at any time.

But the interest is in the same branches and with the same individuals who have made the exhibits what they were these past years. This year we want every branch represented and if possible every plater — whether he is plating battleships or needles — he should be represented.

We are asking each Branch to have a committee to work with this office and with the Milwaukee Chairman in collecting the work. The larger the committee the better, and it is believed that a salesman who meets all the men in the Branch would be an asset.

If possible we would like the committee in each branch to volunteer. With such a committee we will go places.

Will the men who are interested in seeing their branch represented send in your name, address and Branch to Austin Fletcher, 22 Blanchard Avenue, Binghamton, N. Y., before October 1st?

Beginning the work for the Convention brings to mind some of the past conventions and particularly the lack of plant visitations. Are we to lose sight of the fact that plant visitation is as important to a platers convention as the papers read?

Manufacturers are underwriting our expenses to attend these conventions and are entitled to an honest return on their investment. I venture to predict that if we continue to ignore the value of plant visitation the nearest many of us will get to a convention will be the reading of the proceedings at some future date.

Announcing...

ANALYTICAL SETS for

ZINC and CADMIUM

Combined Sets for Metal Content, Sodium Cyanide, Sodium Hydroxide and Sodium Carbonate are easily and quickly operated....direct reading

WRITE FOR LITERATURE

KOCOUR CO.

4725 S. CHRISTIANA AVENUE, CHICAGO

Complete Sets for Chromium—Nickel—Copper—etc. Solutions Colorimetric, Quinhydrone and Glass Electrode Systems for pH

* * PIONEERS IN CONTROL SETS FOR THE PLATER * *

Clean

with

METEX

Two developments that warrant your investigation

METEX CLEANER 1-W

METEX CLEANER #9

Technical Information upon Request

MacDermid Incorporated

WATERBURY CONNECTICUT

UDYLITE pH INDICATOR PAPERS

A method of determining the pH of plating solutions at the tank in as little as five seconds time has just been announced by the Udylite Company of Detroit.

pH Indicator Papers used for this purpose are graded for pH range, and require no technical knowledge to read or understand. pH papers consist of strips of a special paper, impregnated with a highly sensitized indicator and a scale of color bars, each bar being of a different color and having a definite pH value. When the strip is dipped into the solution the indicator will change color. By comparing the color of the indicator with the colors of the color bars, the pH value of the solution can easily be ascertained.

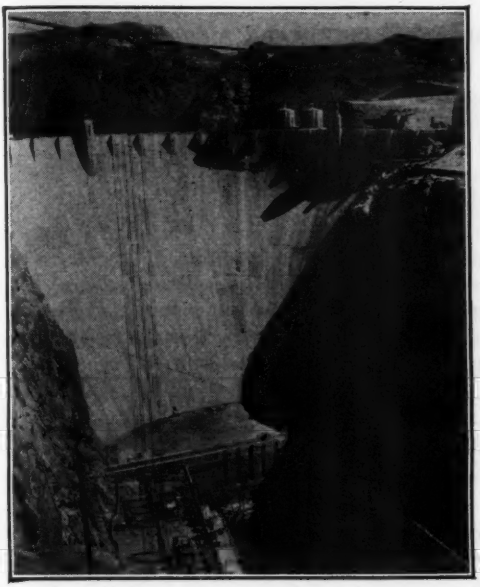
In use a test paper of the desired pH range is selected, dipped for a second in the solution, held to the light and the correct pH reading is instantly obtained by color comparison.

pH papers are also adaptable for determining the pH of alkaline cleaners, a method favored to maintain maximum cleaning efficiency. Cleaners are compounded to give the desired pH and such emulsifying agents are employed which reach the maximum efficiency within the predetermined pH range.

It is claimed that tests conducted by outstanding electro-chemists prove pH test papers to be very accurate. It was found that pH papers compare very favorably with the quinhydrone electrode in accuracy and are more accurate than the colorimeter or comparator. Close comparison with the quinhydrone electrode gives convincing proof of the accuracy of pH papers since the quinhydrone electrode is generally accepted as a very accurate method of determining pH.

pH Indicator Papers come packed 200 in a box, take up little space, and can be carried in the pocket or kept in a convenient place near plating solutions ready for instant use. It is also stated that pH papers do not deteriorate or lose effectiveness in giving correct pH readings over long periods of intermittent use. Udylite pH Papers are available in seven pH ranges from pH 0.9 (strongly acid) to pH 13.5 (strongly alkaline).

Descriptive bulletin giving further information and prices may be obtained by writing the Udylite Company, 1651 East Grand Blvd., Detroit, Michigan.



Boulder Dam is built in the canyon of the Colorado River. It is 727 feet high, 650 feet thick at the base and 45 feet thick at the top. The lake formed will cover about 226 square miles.

Wyandotte

POWER • Adapted to your needs
STABILITY-SERVICE

Every barrel or drum of a metal cleaner bearing the Wyandotte Brand is a safe reservoir of cleaning power. The stability of Wyandotte solutions, the regenerative quality which enables them to "stand up" to heavy duty, is a further inducement to let us suggest the particular type of metal cleaner for your service.

THE J·B·FORD COMPANY
WYANDOTTE MICHIGAN

Please mention THE MONTHLY REVIEW *when writing*

NEW SPENCER OIL-BURNING FURNACE SHOWS TREND IN MODERN DESIGN

The Spencer Heater Company's 1937 model domestic oil heater, which was recently cited as "The Best Design of the Month" by *Electrical Manufacturing*, is an interesting example of certain tendencies in modern product design, according to Maas and Waldstein Company, who furnished the finishes used on this heater.

Mr. Gilbert Rohde, who designed the Spencer heater, studied the question of color carefully before selecting those to be used. Previously, Spencer heaters had been finished in bright reds and greens. These appealed strongly to buyers at first, but Mr. Rohde found that women are now asking for colors that give them more leeway in decorating basement rooms, and decided that those to be used must be less striking but no less attractive to women.

He also decided that the colors used must be satisfactory under two very different sets of conditions — in the brightly illuminated show room and in the dimly lighted basement. Many colors that are attractive in bright light lose their character in the shadow, and this fact narrowed the range of choice still further.

The problem was finally solved by a lustrous lacquer-enamel, Metalustre, in two shades of bluish-grey for the large areas of the heater, with certain details in strong red and in polished aluminum. The combination results in "instantaneous, compelling, visual appeal," according to Robert Heller, industrial designer, who presented the heater for award.

The finish used on the Spencer heater is not only attractive, but it also effectively protects the metal from corrosion. This is effected by using a baked synthetic primer under the finishing coat of metalustre. This type of primer aids in securing a good finish as it dries out of dust in five minutes and adheres strongly to the metal. The finish of the heater is not only pleasing to the eye but will maintain its good looks for a long time after the heater is placed in service.

A NEW DIELECTRIC ENAMEL

A new black enamel, with special dielectric properties, has been developed by Maas & Waldstein Company, makers of industrial finishes, Newark, New Jersey.

This new dielectric enamel is especially suitable for finishing electrical apparatus, such as steel switchboards and instrument panels, coils, and radio bases. It dries to a rubber finish, and is tough, durable, and has high electrical resistance, according to the manufacturer. It is applied by spraying, and a switchboard panel that has been marred or defaced can be easily refinished without dismantling by spraying on another coat of the enamel.

A surfacer, with similar dielectric properties, is also supplied for preparing the surface to be finished with the enamel.

This finish was used on all the switchboards and buss boards in all the power plants and sub-stations in Los Angeles and in the Owens Valley system that brings the power from Boulder Dam to Los Angeles.

PURICO WONDERBAR

Pre-Saponified Compositions for Buffing and Polishing

Satisfy the most particular users.

Ideal for use on pierced, grooved, and filigreed work because it is pre-saponified, and washes absolutely clean, faster and without scrubbing.

REDUCES { Time / Expense / Rejections

Divine Brothers Company

Utica, N. Y., U. S. A.

50 years of Service

on the most varied and exacting cleaning tests.

KALYE

A heavy duty cleaner that can be used on rough work and on the most delicate of jewelry finishes.

Not the cheapest but sold on its merits.

Send for a free copy of our Kalye manual.

Manufactured by
RUMFORD CHEMICAL WORKS
RUMFORD, R. I.

4A

CEMENT and THINNER

Has been thoroughly tested in large and small plants and highly approved. It is used in place of glue for setting up wheels, belts, rolls, buffs, etc. We will be pleased to send you a suitable sample of Cement and Thinner for test purposes.

4A Cement and Thinner is going to make a name for itself the same as the other 4A Products because 4A means QUALITY and UNIFORMITY at all times.

HARRISON & COMPANY
HAVERHILL, MASS.

McALEER

Polishing & Buffing
COMPOSITIONS
are recognized for

QUALITY
ECONOMY
UNIFORMITY

Our new laboratory and staff will be glad to assist you in your Polishing and Buffing problems

McALEER MANUFACTURING CO.
2431 Scotten Ave.
DETROIT, MICHIGAN

"Insist on McAleer's"

AUTOMATIC VAPOR-SPRAY-VAPOR DETREX DEGREASER

The complete line of standard and special degreasing machines manufactured by the Detroit Rex Products Company of Detroit, Michigan, has been augmented by the large, completely automatic degreaser shown in Fig. 1. It is used for the cleaning of miscellaneous metal stampings.

This special vapor-spray-vapor machine is equipped with a two-strand, cross-rod type conveyor arranged for loading and unloading at the same end. The work is placed in perforated baskets which are hung from the cross-rods of the conveyor. In passing through the degreaser, work is lowered into the hot solvent vapors which thoroughly wet the work and remove part of the heavy contamination. As the conveyor moves horizontally along the machine beneath the water jacket condenser, clean warm solvent is pressure-sprayed onto the work from banks of spray nozzles. This mechanical action forcibly removes and drives off the solids. A final cleaning in pure solvent vapors insures complete removal of oil and grease. Returning back overhead to the loading and unloading station, the work emerges clean, warm, and dry — ready for subsequent finishing operations.

Steam coils are placed in the boiling sump (shown at the left end of Fig. 1) and in the clean solvent distillate collecting sump (shown at the right end of the machine). Galvanized steam coils are welded to removable clean-out doors.

A vapor-actuated, air-operated control system, consisting of thermostat temperature indicator and valve, is used to regulate the heat input, control the height of the vapor column, and insure maximum operating economy. A self-actuated valve in the steam line which heats the clean solvent distillate controls the temperature of the hot solvent used for spraying.

A water jacket condenser and a solvent collecting trough encircles the machine. The collecting trough is arranged so that the clean distillate can be made to flow into the spray sump at the right end of the degreaser or into the clean solvent storage tank at the back of the machine. The solvent that drains from the work, as well as the over-flow from the clean solvent spray sump, flows back into the boiling sump.

The clean solvent storage tank is of sufficient capacity to hold all of the solvent from the machine during the distilling operation. In this way, the contamination is removed and the solvent reclaimed for further use by distillation within the machine itself.

The rated production cleaning capacity of the degreaser shown in Fig. 1 is approximately 3000 lbs. of work per hour at a normal conveyor speed of 6 ft. per min. The conveyor speeds can be increased to 12 ft. giving 6000 lbs. produced per hour. The overall dimensions of this unit are: approximately 13 ft. long, 7 ft. wide, and 11 ft. high. The solvent capacity is only 120 gallons.

COPIES OF THE INTERNATIONAL ELECTRO-DEPOSITION CONFERENCE IN LONDON

We have just recently been informed that Volumes of the above Conference will be sold to members of the A. E. S. for $4.00 if ordered through the society. All others desiring copies must pay the regular price which is $6.50 including duty, postage, etc.

Orders for the proceedings of the International Conference may be placed with the Executive Secretary, 90 Maynard Street, Springfield, Mass.

1892 . . . 1893 . . . 1894
1895 . . . 1896 . . . 1897
1898 . . . 1899 . . . 1900
1901 . . . 1902 . . . 1903
1904 . . . 1905 . . . 1906
1907
1912
1917
1921
1926
1930
1934
1937

BACKED BY EXPERIENCE

Production of Anodes and Chemicals in the Harshaw plants is based on tried and proved methods of manufacture - methods formulated by experts who for thirty years have worked in cooperation with plating customers .... Every phase of the plating operation has been taken into consideration in the development of better anodes and chemicals .... You can depend on Harshaw Quality Anodes and plating Chemicals for continuous production and best results.

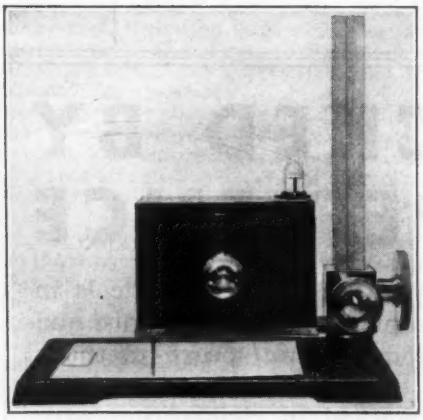
THE HARSHAW CHEMICAL CO.
Manufacturers, Importers, Merchants.
Offices and Laboratories: Cleveland, Ohio
Quality products since 1892

New York, Philadelphia, Chicago, Detroit, Pittsburgh, Cincinnati, East Liverpool, Los Angeles, San Francisco. Works at Cleveland and Elyria, Ohio and Philadelphia, Pa.

A NEW INSTRUMENT FOR MEASURING THE THICKNESS OF NICKEL COATINGS ON NON-MAGNETIC BASE METALS

The local thickness of an electroplated nickel coating on a non-magnetic base metal may be measured by this new instrument announced by the American Instrument Co., Silver Spring, Md.

The principle of the method involves the measurement of the force required to detach one pole of a permanent magnet from the nickel coating, and the comparison of this force with that required to detach the same magnet from a similar nickel coating of known thickness.



The instrument is calibrated with nickel coatings of known thickness which have been deposited under about the same conditions as the coatings to be tested. Nickel coatings deposited under different conditions have somewhat different magnetic permeabilities, but if such coatings are annealed at 400° C. (750° F.) they acquire about the same permeability, therefore the magnetic method is more reliable for annealed coatings than for coatings as deposited.

Measurements on coatings as deposited are correct within 15%, and on annealed coatings within 10%.

The magnetic method is rapid and non-destructive, and for thin coatings its accuracy approaches that of metallographic measurements.

The metallographic method (in which the thickness of coatings is measured by means of a microscope and scale) requires experience and expensive equipment, and results in destruction of the specimen tested.

The sensitivity of this instrument can be varied by the proper selection of the spring, each division on the dial corresponding to approximately 0.00025 mm. (0.00001 in.) of nickel, so that the 100 divisions cover the range of thickness usually applied to non-ferrous metals. The reproducibility is about 3% on coatings down to about 0.0005 mm. (0.00002 in.).

The new instrument is equally applicable to plane, convex and concave surfaces. The presence of the usual thin chromium coatings over the nickel has no appreciable effect on the thickness measurements, and is advantageous because it prevents oxidation of the nickel during annealing.

The new instrument is compact and light in weight — measures 5x9x9 in. high, and weighs only 7½ lb. without its carrying case.

A complete description of this instrument may be had from the manufacturer upon request.